

# Notice of Allowability

Application No.

10/517,772

Examiner

Walter L. Lindsay, Jr.

Applicant(s)

FUKUDA ET AL.

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to an Application filed on 12/27/2005.
2. ☒ The allowed claim(s) is/are 1-44.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All b) ☐ Some\* c) ☐ None of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

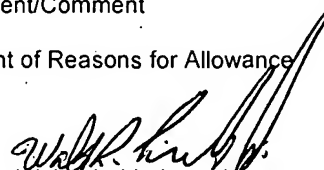
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date See Continuation Sheet
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
Walter L. Lindsay, Jr.  
Primary Examiner  
Art Unit: 2812

Continuation of Attachment(s) 3. Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date: 8/8/2007, 3/4/2005, 12/27/2004.

### DETAILED ACTION

This Office Action is in response to an Application filed on 12/27/2004.

Currently, claims 1-44 are pending.

#### ***Allowable Subject Matter***

1. Claims 1-44 are allowed.
2. The following is an examiner's statement of reasons for allowance: the prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...forming a gate insulation layer on a semiconductor region formed of silicon carbide having a (000-1) face orientation; and wherein the gate insulation layer is formed in an atmosphere containing 1% or more H.sub.2O (water) vapor at a temperature of from 800.degree. C. to 1150.degree. C. to reduce an interface trap density of an interface between the gate insulation layer and the semiconductor region, as required by claim 1;

...forming a gate insulation layer on a semiconductor region formed of silicon carbide having a (000-1) face orientation; and wherein the step of forming the gate insulation layer is followed by heat treatment in an atmosphere containing H.sub.2 (hydrogen) gas or H.sub.2O (water) vapor to reduce an interface trap density of an interface between the gate insulation layer and the semiconductor region, as required by claim 3;

... forming a gate insulation layer on a semiconductor region formed of silicon carbide having a (000-1) face orientation; and wherein the step of forming the gate insulation layer is followed by heat treatment in an atmosphere containing H.sub.2O

Art Unit: 2812

(water) vapor, followed by heat treatment in an atmosphere containing H.sub.2 (hydrogen) gas to reduce an interface trap density of an interface between the gate insulation layer and the semiconductor region, as required by claim 4;

...gate insulation layer on a semiconductor region of (000-1) face silicon carbide, a gate electrode on the gate insulation layer and an electrode on the semiconductor region, wherein a hydrogen or hydroxyl group (OH) level in the gate insulation layer is from  $1\text{E}19/\text{cm}^3$  to  $1\text{E}20/\text{cm}^3$ , as required by claim 27; and

...a gate insulation layer on a semiconductor region of (000-1) face silicon carbide, a gate electrode on the gate insulation layer and an electrode on the semiconductor region, wherein a hydrogen or hydroxyl group (OH) level at an interface between the gate insulation layer and the semiconductor region is within a range of from  $1\text{E}20/\text{cm}^3$  to  $1\text{E}22/\text{cm}^3$ , as required by claim 36.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter L. Lindsay, Jr. whose telephone number is (571) 272-1674. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone

Art Unit: 2812

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Walter L. Lindsay, Jr.  
Primary Examiner  
Art Unit 2812

WLL

September 27, 2007